

Common Ground in Geocollaboration

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Project Objectives

- Investigate a collaborative workspace that provides:
 - multiple role-specific views and team view
 - geo-spatial planning task
- Integrate research from Information Visualization and Computer-Supported Cooperative Work
- Prototype for geo-collaborative tactical operations planning; use our open-source collaborative infrastructure
- Define measures for evaluating common ground in experimental settings
- Articulate relationships between common ground and other computer-supported collaboration constructs





Research Question

 How can collaborative construction of a geo-spatial plan visualization ameliorate problems of too much and too little common ground?

• Approach:

- Obtain and edit real/realistic map content
- Design and implement experimental task
- Implement collaborative map interactions





Outcomes

PENNSTATE

HCI

- Convertino, G., Ganoe, C.H., Schafer, W.A., Yost, B. & Carroll, J.M. 2005. A Multiple View Approach to Support Common Ground in Distributed and Synchronous Geo-Collaboration. In Proceedings of the *Third International Conference on Coordinated & Multiple Views in Exploratory Visualization (CMV 2005)*, July 5th 2005, London, UK.
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- Schafer, W., Carroll, J.M. & Haynes, S. submitted. Emergency management as collaborative community work.

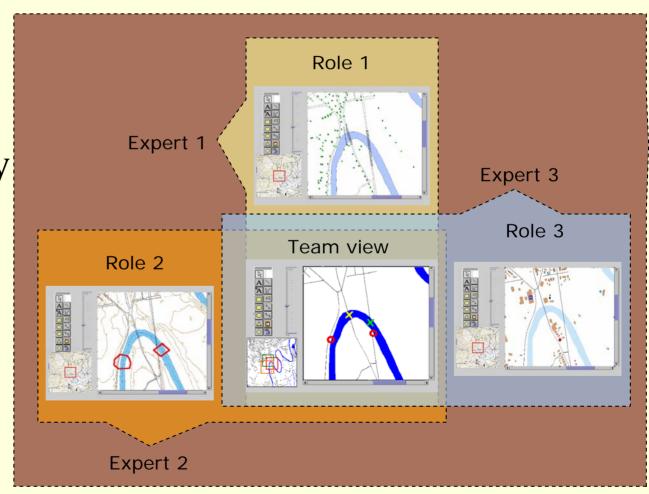


Common Ground Experiment

Role-specific map-views

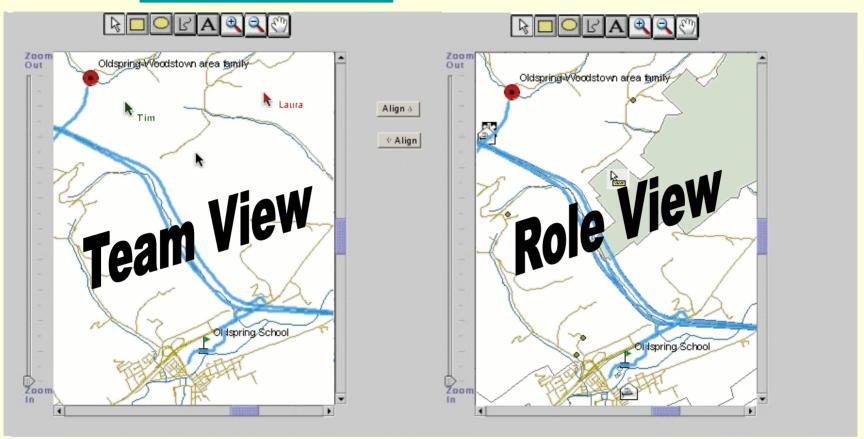
Complementary knowledge

Team view is constructed jointly





Multiple views design



- Three users, each with specific role
- Each user sits at a separate computer





Multiple View Issues

- How do users share information using maps?
- How do they stay aware of others' actions and references?
- What features are available with each view? (navigation, query, annotation)
- How do you coordinate actions across views?





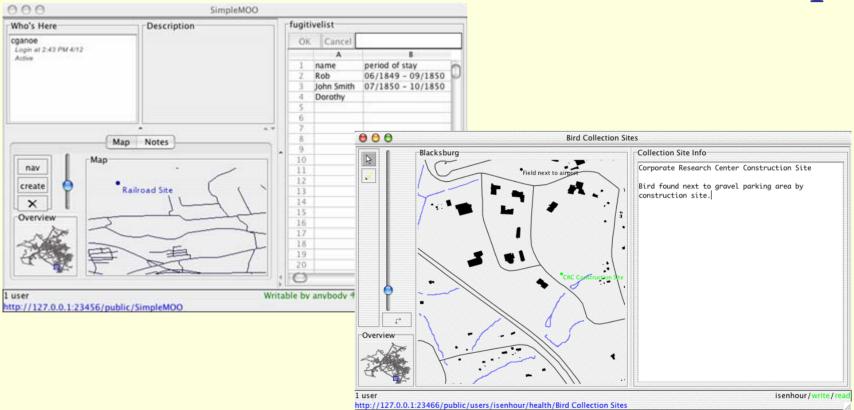
Geocollaboration

- Geocollaboration: How can people collaborate with map software?
- Numerous design decisions
- Existing software tools make different choices





BRIDGE Collaborative Map



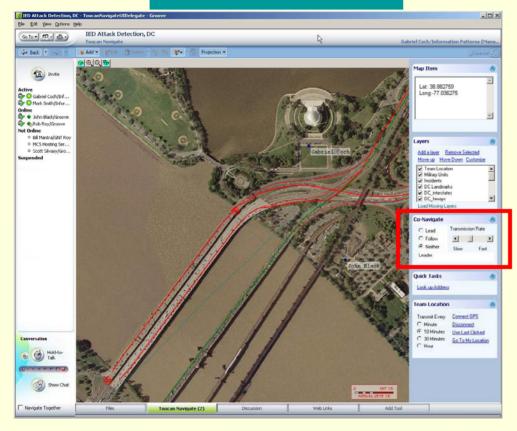
 Users add spots to map and link to other content





Toucan Navigate

(www.infopatterns.net)





 Navigation controls for working alone, following, or leading





Geocollaboration Architecture

- Geocollaboration Software Architecture
 - Based on a survey of existing map tools
 - Supports a variety of geocollaboration features
- Software offers:
 - Toolkit for developing geocollaboration applications
 - Support for using multiple features in combination
 - Sandbox for developing new features





Architecture Development

- Open-source development project
- Integrates two existing software toolkits:
 - CORK: collaborative infrastructure, replicated objects
 - GeoTools: GIS toolkit, standards compliant
- Focus on reusable and extensible objects





Geocollaborative SW architecture

Geocollaborative BRIDGE Tools							
Shared User Activity			Shared Geographic Map				
Shared History (BRIDGE)	Shared Cursors	Shared Viewpoints	Shared Geospatial Data: Shapefiles, User-Created Data, Styles				
Co	ollaborativ (C	GIS Tookit (GeoTools)					





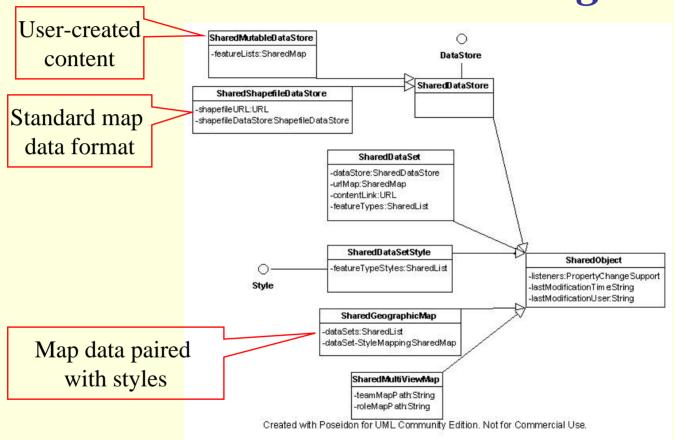
Reuseable Objects

- Same map data is useful for multiple applications
 - Centre county roads, rivers, and buildings:
 - Emergency management software
 - Underground Railroad research
- Applications require different rendering techniques
 - EM: different road types and lane markings
 - UGRR: major roads, historic building sites





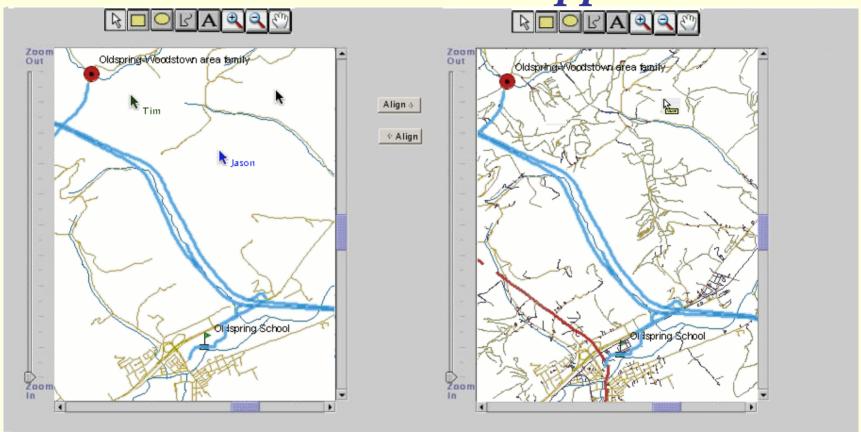
Architecture Class Diagram







Multiple Views Application



- Build views from existing map objects
- Share mouse cursors across maps





Emergency Management Scenario

- Emergency task: plan a rescue for a family stranded by flood
- Three, interdependent *roles*
 - *Public works* (utilities and roadway infrastructure)
 - Environment (floodplains and weather)
 - Mass care (shelters/rescuees' needs and vehicles)
- Roles based on an emergency operations center





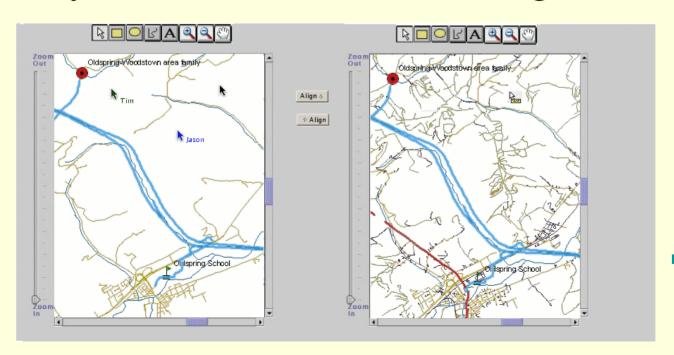
Demonstration





Other Features

- Draw annotations, pass across views
- Align viewports
- Synchronize team view navigation







Comments, Questions, Suggestions? Thanks!



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